



BOURDON FORGE COMPANY, INC.

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Slippage Test Report

- 1.0 Subject: Tensile Test on Slippage between two components, fabric webbing and metallic hardware.
- 2.0 Purpose: To determine root cause of slippage and establish numerical value for gripping between webbing and hardware.
Note: Numerical value for slippage is unknown and not required at this time.
- 3.0 Background: In February 2006, during the regular PIA meeting, one of the members raised concern of slippage between webbing and hardware components. The assembly in question was not available for review. However, at the end of the committee's discussion, we all agreed to conduct testing and to establish some criteria for the slippage.
- 4.0 Objective: Tensile test samples of hardware with different plating and fabric webbing with different surface treatments.
- 5.0 Definitions: Each test sample is identified with serial number and designator of final surface treatment.
EN-electroless nickel plating
CAD-cadmium plating
PC-phosphate coating
- 6.0 Test Equipment:
1. Tinius Olsen Tensile Tester
 2. Sensotec Load Cell
 3. Hard Fixtures



7.0 Materials:

I. Fabric Webbing

- a) Purple color TY7 unknown treatment .090-.096 thick
- b) Gold color TY7 Cond R Mil-W-4088 w/spray Latt .095 thick
- c) Army Green color TY7 treated to Mil-W-27265 .080 thick
- d) Black color TY7 untreated .075 thick
- e) Red color TY7 w/ Resin Spray Latt .075 thick
- f) Black color TY7 w/ Resin Spray Latt .081 thick
- g) Navy Blue color TY8 Cond R w/ Resin .051 thick
- h) Brown color TY7 unknown treatment .075 thick
- i) Royal Blue color TY7 unknown treatment .085

II. Metallic Hardware

- a) PS70114 EN S/N's 1-4 Slide Bar formed
- b) PS70114 CAD S/N's 5-8 Slide Bar formed
- c) PS70114 PC S/N's 9-12 Slide Bar formed
- d) PS70124 EN S/N's 13-15 "U" Shape Slide Bar
- e) PS70124 CAD S/N's 16-18 "U" Shape Slide Bar
- f) PS27765 EN S/N's 19-21 V-Ring Slide Bar formed
- g) PS27765 CAD S/N's 22-24 V-Ring Slide Bar formed
- h) PS27765 PC S/N's 25-27 V-Ring Slide Bar formed
- i) PS22040 CAD S/N's 28, 29 Slide Bar Formed
- j) PS22040 EN S/N's 30 Slide Bar Formed



- 8.0 Procedure:
- 8.1 Retrieve sample of fabric webbing and attach one end to hard fixture mounted in tensile tester.
 - 8.2 Retrieve serialized sample of metallic hardware
 - 8.2.1 Hold the part with heavy ends of the slide bar facing forward
 - 8.2.2 Insert open end of the webbing over the radial surface of the slide bar
 - 8.2.3 Lift the slide bar and insert end of webbing in to body of the frame and pull end of webbing down, applying pressure on the slide bar.
- Note: Heavy bar at the bottom of the frame must be on the far side of the assembly.
- 8.2.4 Attach open end of the frame to hard fixture of the tensile tester.
 - 8.2.5 Pull down exposed end of the webbing until there is load on the slide bar, and tension on the webbing supported by top and bottom of fixtures.
 - 8.2.6 Cut strip of white surgical tape approx. 2 in. long and attach to front of the webbing over the slide bar. The tape is the sight in determining the slippage.
 - 8.2.7 Activate tester and apply static load at 80-100 lbs/sec.
 - 8.2.8 Observe the sight for slippage, visually check load cell, at what point webbing slipped, and compare results with tensile test dial.
 - 8.2.9 Record the results. The results will be part of the permanent records.
- 8.3 Repeat Para 8.1 thru 8.2.9 for each of the webbing and hardware sample specified in Para 7.0



9.0 Analysis:

The review and comparison of variable data in Fig. 1 with different combination, exhibits some of the positive and negative attributes between components.

1. Phosphate coated hardware is best suited regardless of type of fabric webbing and treatment utilized.
2. Army Green TY7 treated to Mil-W-27765 .080 thick looks adequate for cad plated parts with formed slide bar or “U” shaped slide bar
3. Black webbing untreated .075 thick has the best results regardless final surface treatment including electroless nickel plated hardware.
4. Hardware with electroless nickel surface finish shows consistent low results regardless of the type of webbing used.

10.00 Conclusion:

The data in Fig 1 indicates that both components, webbing and hardware with different surface treatments, have adverse effect in maintaining grip and prevention of slippage.

11.00 Recommendation:

Suspend use of electroless nickel plating on adjuster type of hardware. The finish is different than PS part print requirements. Also, due to different treatment of the fabric as data indicating, the slide bar may have to be redesigned to different shape for commercial use adjusters.

Respectively Submitted on October 13, 2006
by the Engineering Staff at Bourdon Forge Company, Inc.

	S/N	a) PURPLE TRTD.	b) GOLD TRTD.	c) ARMY GREEN TRTD.	d) BLACK UNTR.	e) RED TRTD.	f) BLACK TRTD.	g) NAVY BLUE TRTD.	h) BROWN TRTD.	i) ROYAL BLUE
PS 70114 EN a)	1	120	40	200	300	30	60	60	120	80
	2	260	40	250	400	20	40	80	150	100
	3	340	60	290	290	40	60	60	80	60
	4	480	40	280	330	50	60	80	280	60
AVERAGE		300	45	255	330	35	55	70	158	75
PS 70114 CAD b)	5	540	90	700	800	60	60	150	350	40
	6	800	60	750	550	100	80	20	250	60
	7	800	280	800	500	80	100	20	450	80
	8	750	80	1050	690	120	120	25	500	40
AVERAGE		723	127	825	635	90	90	54	388	55
PS 70114 PC c)	9	1660	1200	1480	1500	2100	1600	750	1800	400
	10	1500	1600	1500	1800	1000*	1700	600	1500	1100
	11	1760	2200	1600	1900	1300*	1700	900	1700	1100
	12	1780	2500	1600	1600	1700*	1600	500	1600	1300
AVERAGE		1675	1875	1545	1700	1525	1650	688	1650	975
PS 70124 EN d)	13	60	750	700	550	120	300	1100	900	300
	14	60	680	720	1050	250	360	250	900	350
	15	80	700	500	500	320	320	500	1200	400
AVERAGE		67	710	640	700	230	326	616	1000	350
PS 70124 CAD e)	16	150	380	1000	1050	350	960	250	300	300
	17	180	300	860	800	160	700	200	500	700
	18	580	200	200	1200	80	80	250	280	450
AVERAGE		183	310	920	883	286	753	200	533	483
PS 27765 EN f)	19	580	200	200	1200	80	80	750	280	500
	20	480	40	160	1150	30	40	80	320	240
	21	400	180	100	550	120	40	160	600	400
AVERAGE		486	140	153	966	76	53	763	400	380
PS 27765 CAD g)	22	1150	450	600	1500	350	680	150	750	700
	23	1300	1100	760	1550	700	800	110	800	800
	24	900	780	860	1480	100	780	220	550	880
AVERAGE		1116	776	740	1510	683	753	156	700	793
PS 27765 PC h)	25	1700	2000	1700	2550	2000	1500	2200	1800	1800
	26	2400	2600	1560	1850	2300	1600	2000	1650	1800
	27	1800	2800	1800	2000	2500	1800	1850	1950	1900
AVERAGE		1966	2466	1686	2133	2266	1633	2016	1800	1833
PS 22040 CAD i)	28	500	40	1400	700	40	360	40	300	600
	29	680	90	1250	1100	60	460	150	200	750
AVERAGE		590	65	1325	900	50	410	95	250	687
PS 22040 EN j)	30	80	20	100	220	30	40	60	130	450
AVERAGE										

* TEST SUSPENDED AND WEBBING INSPECTED FOR DEGRADATION

FIG. 1